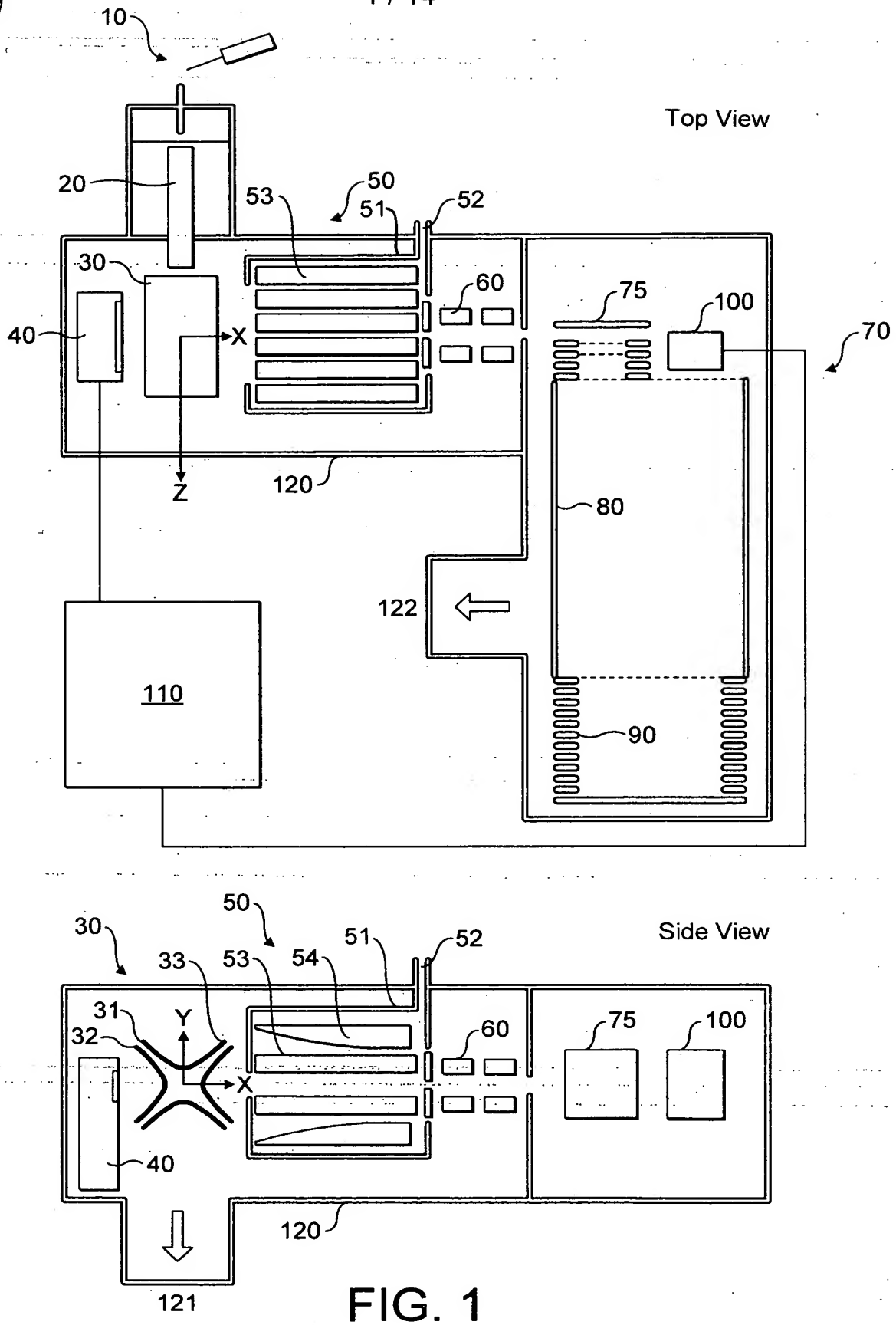

FIG. 1

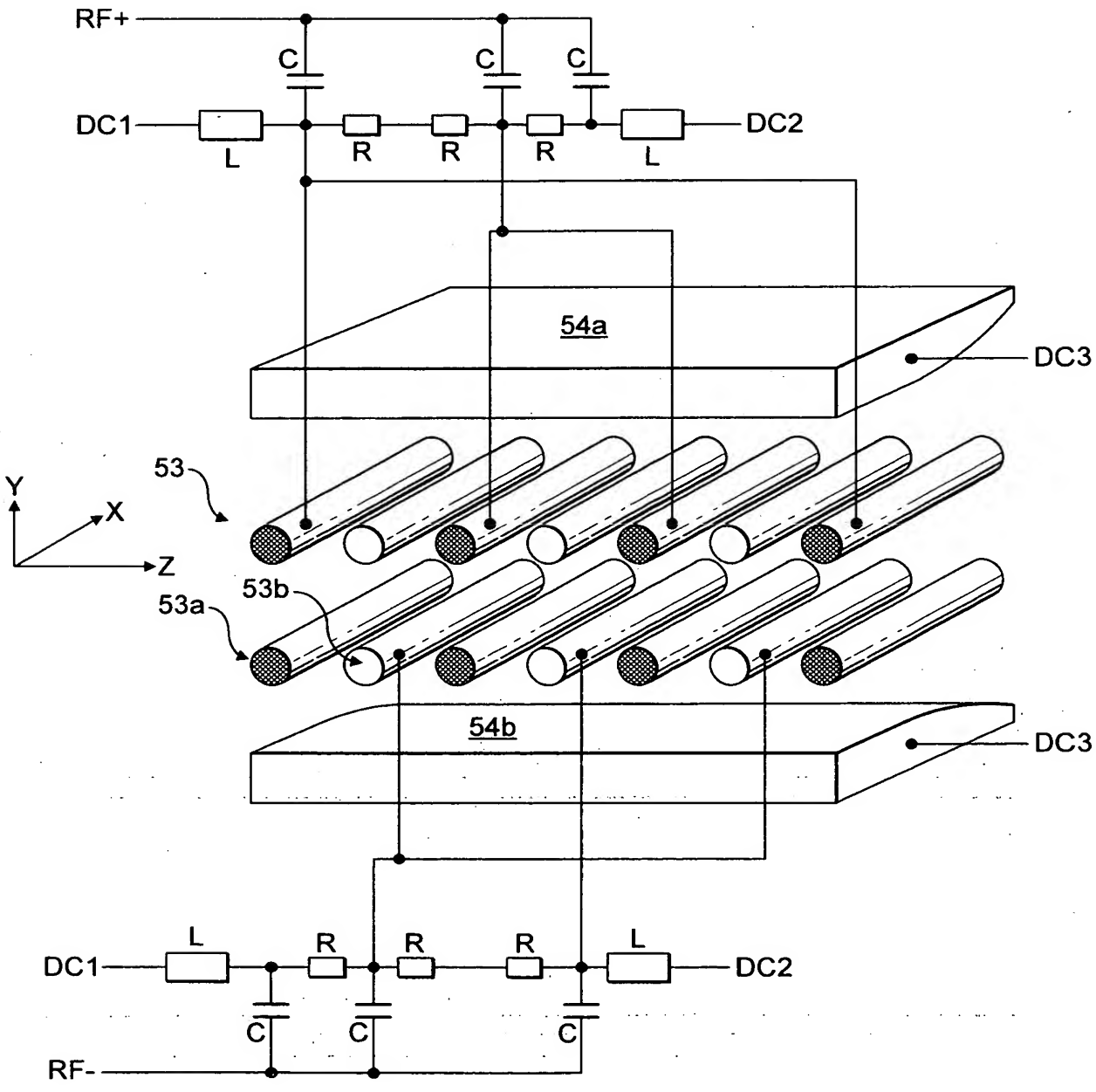
RF+
C
C
C
DC1
L
R
R
R
L
DC2
54a
DC3
53
Y
X
Z
53b
53a
54b
DC3
L
R
R
R
L
DC1
DC2
C
C
C
RF-

FIG. 2

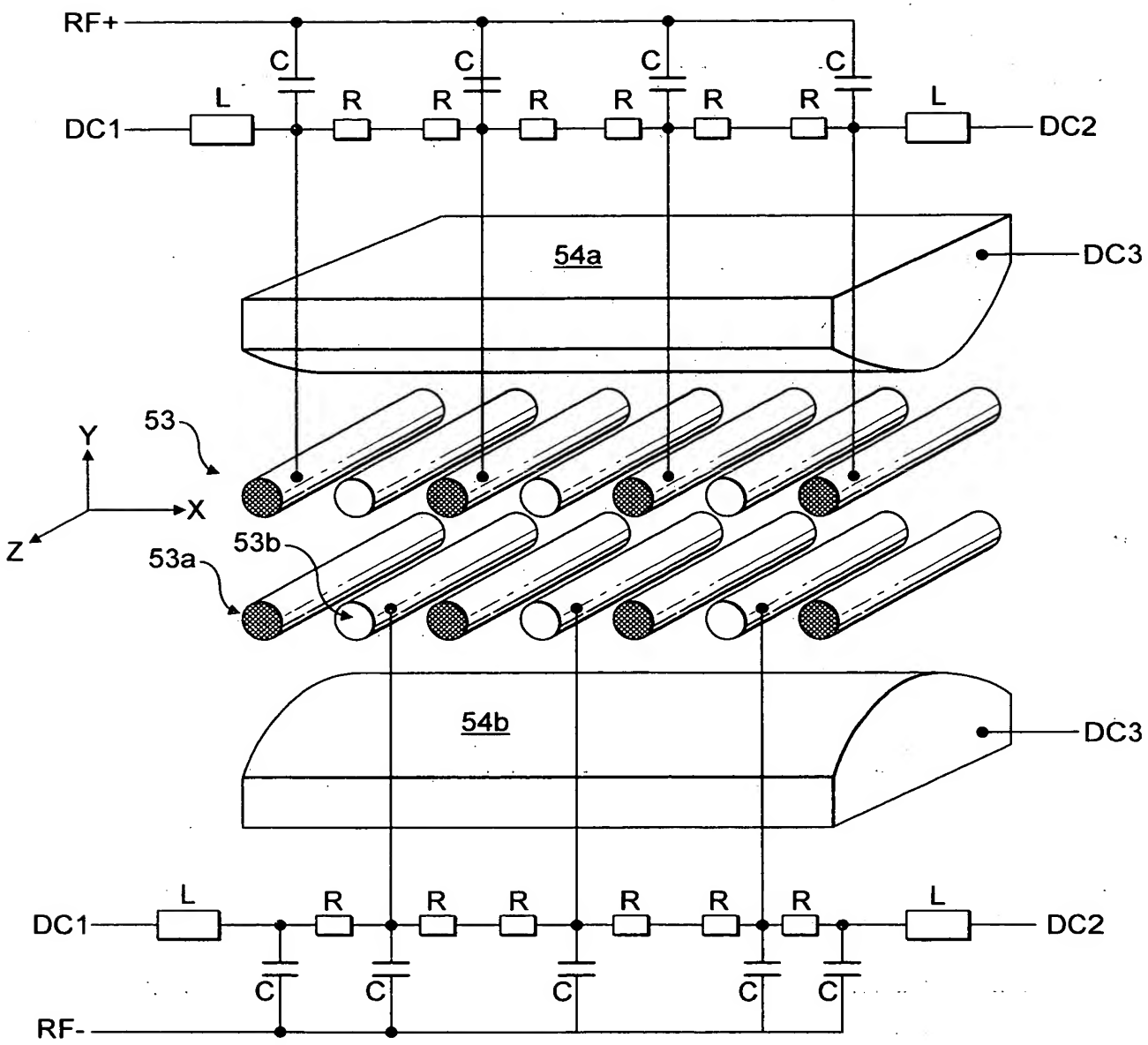
RF+
C
C
C
C
L
R
R
R
R
R
R
L
DC1
DC2
54a
DC3
53
Y
X
Z
53b
53a
54b
DC3
L
R
R
R
R
R
R
L
DC1
DC2
C
C
C
C
C
RF-

FIG. 3

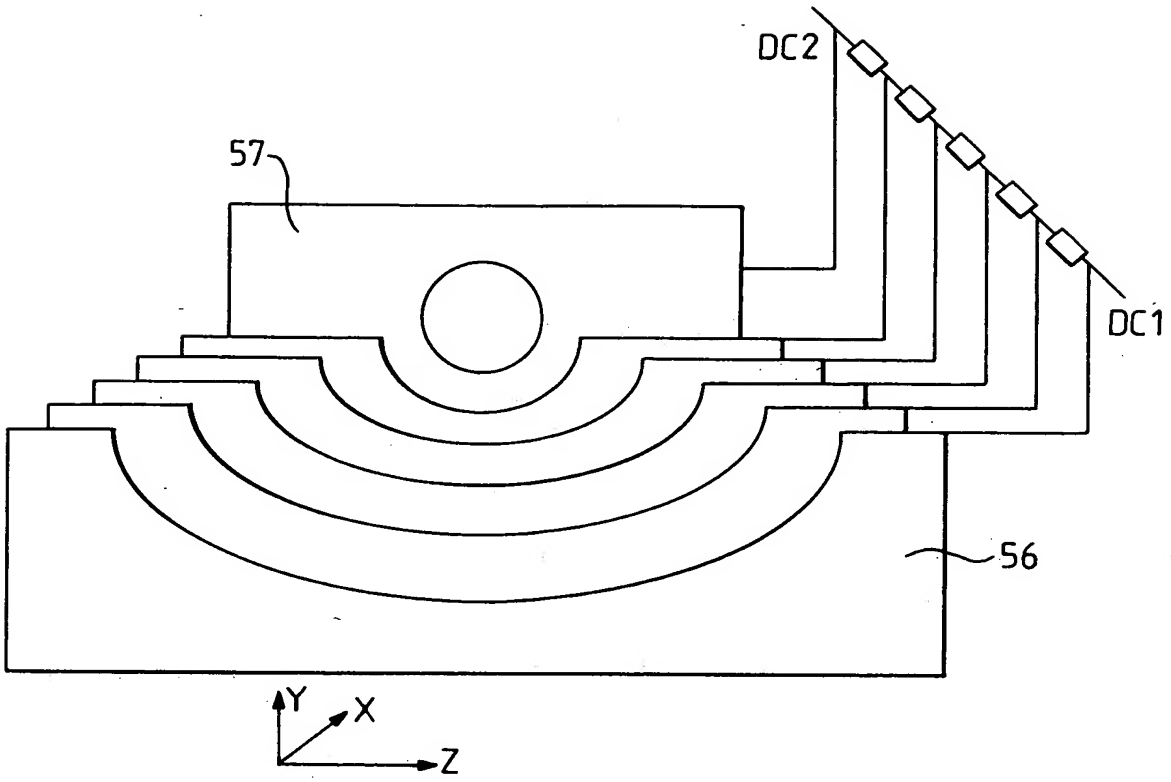

FIG. 4a

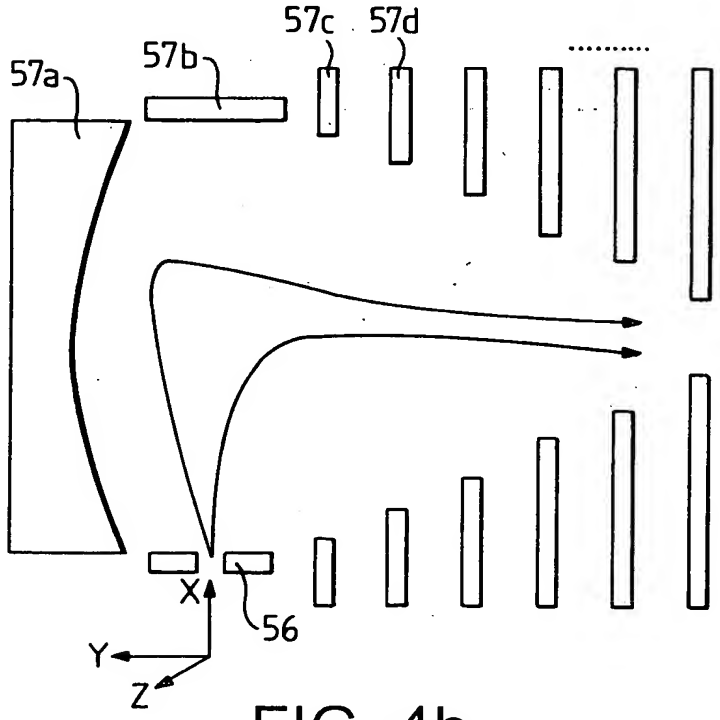

FIG. 4b

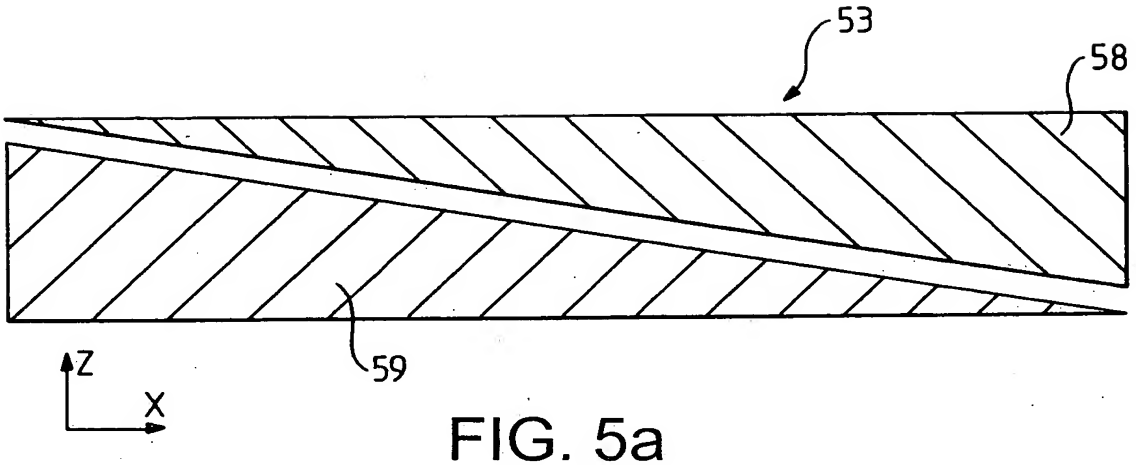

FIG. 5a

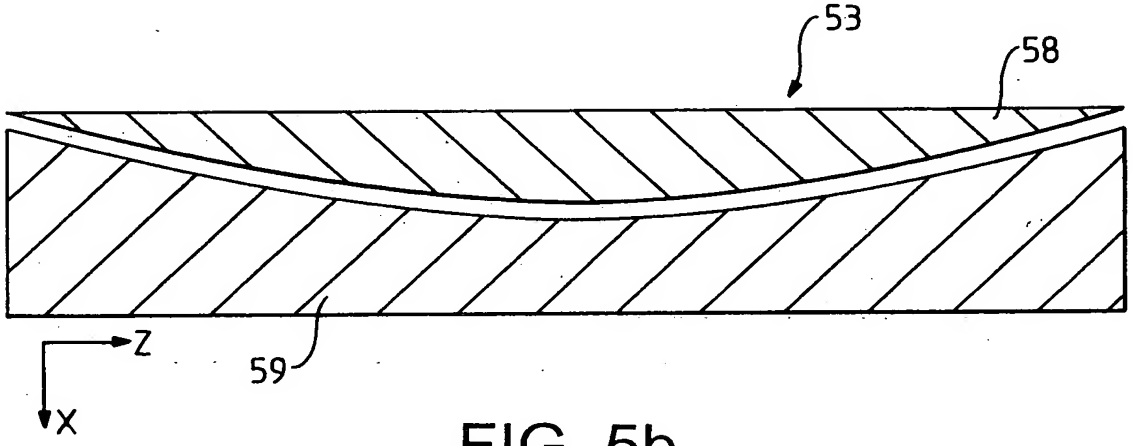

FIG. 5b

Partitioning of Rod Electrodes to Allow For x Field gradient

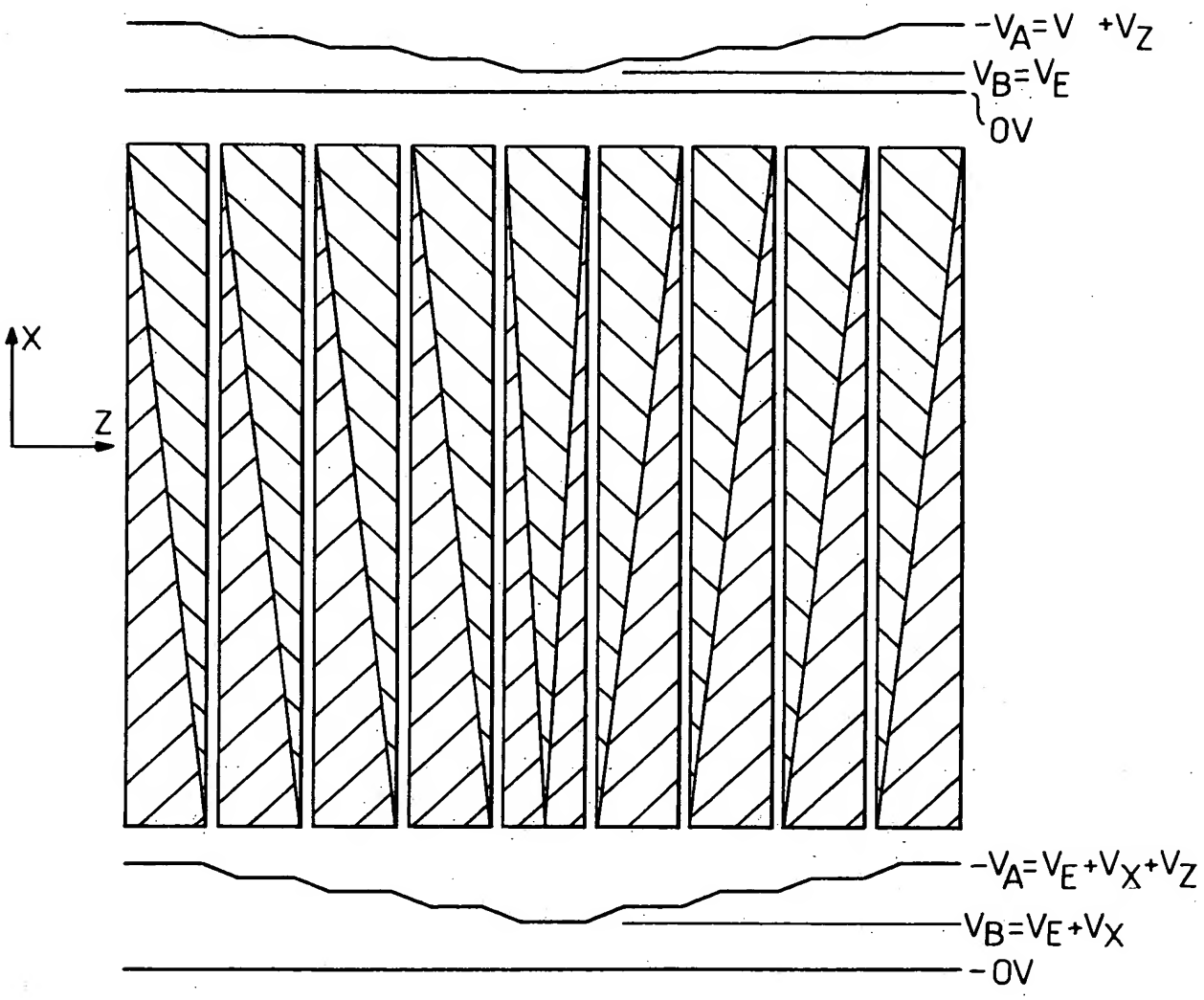

FIG. 6a

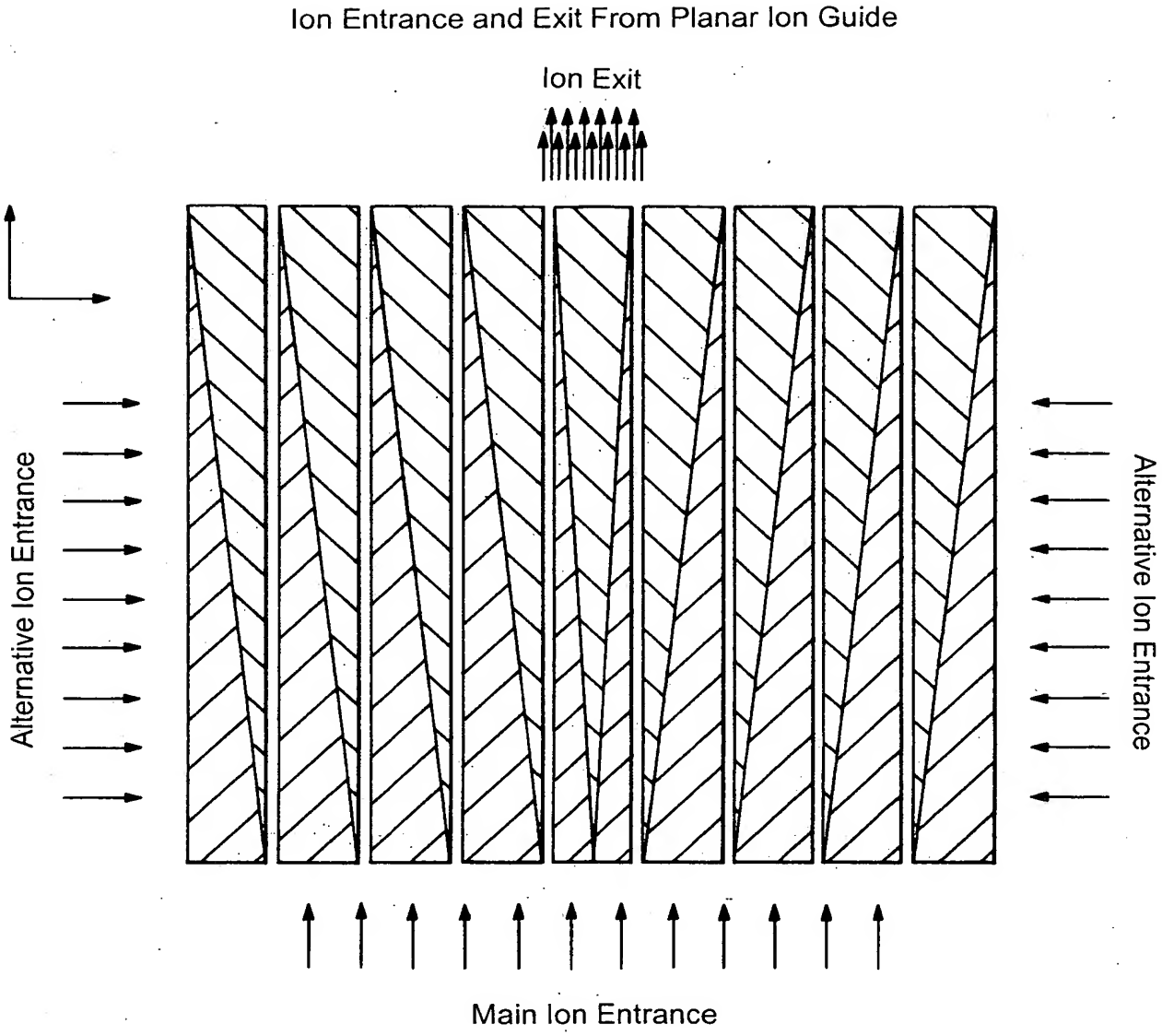
Ion Entrance and Exit From Planar Ion Guide
Ion Exit
Alternative Ion Entrance
Alternative Ion Entrance
Main Ion Entrance

FIG. 6b

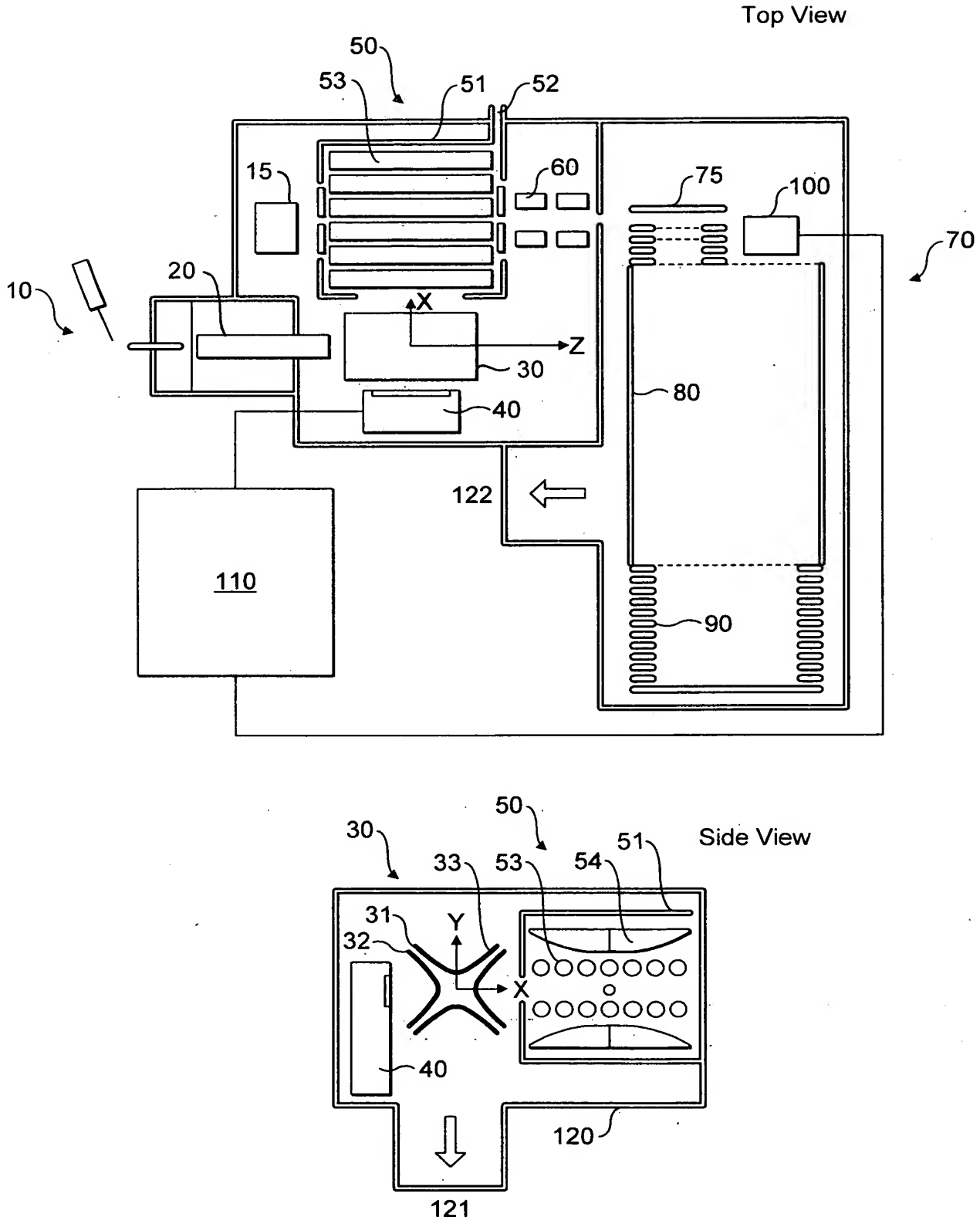
Top View
50
53
51
52
15
60
75
100
70
10
20
X
Z
30
40
80
122
110
90
Side View
50
30
33
53
54
51
31
Y
32
X
40
120
121

FIG. 7

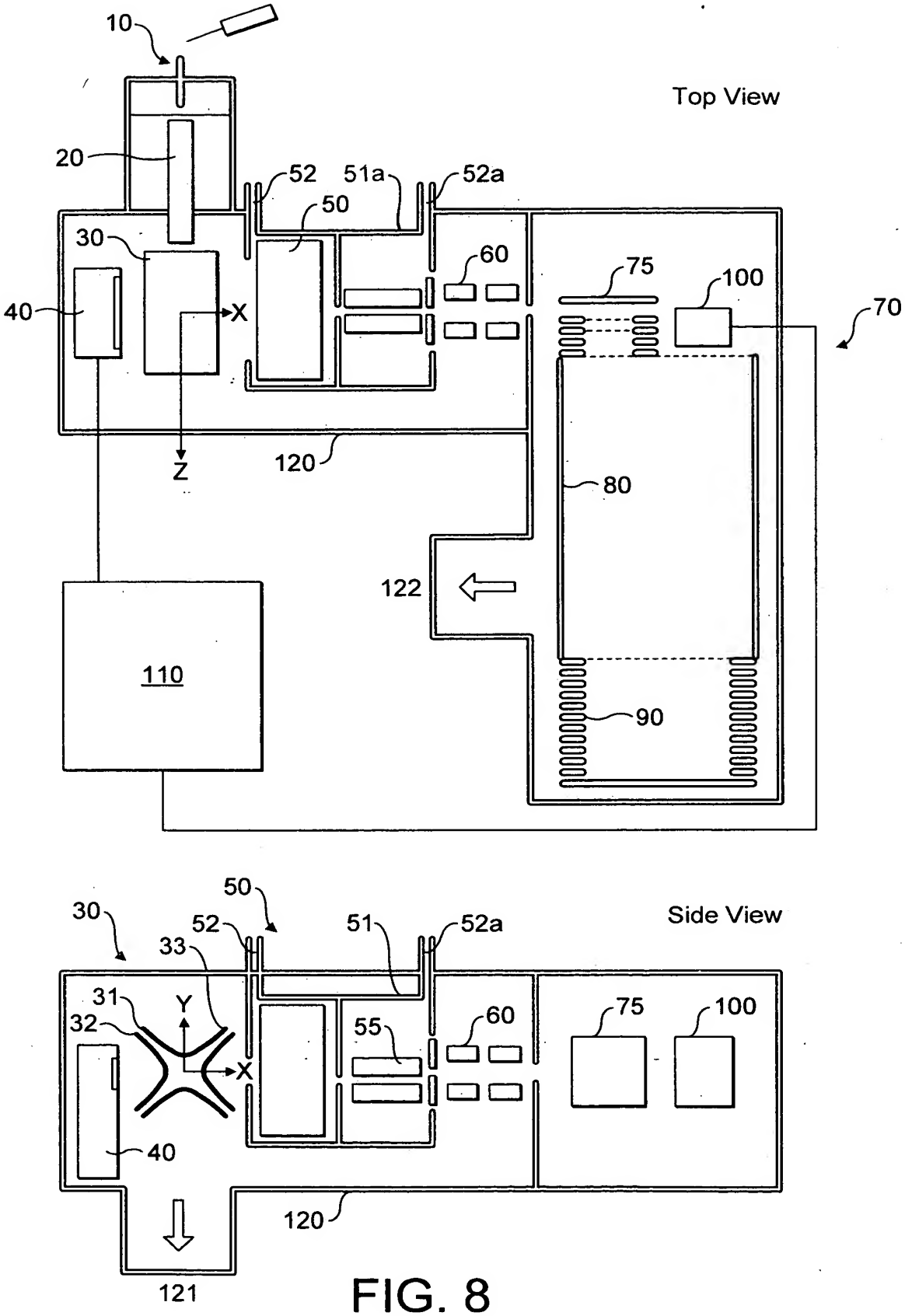
10
Top View
20
52
51a
52a
50
30
60
75
100
70
40
X
Z
120
80
122
110
90
50
30
52
51
52a
Side View
33
31
Y
32
X
55
60
75
100
40
120
121

FIG. 8

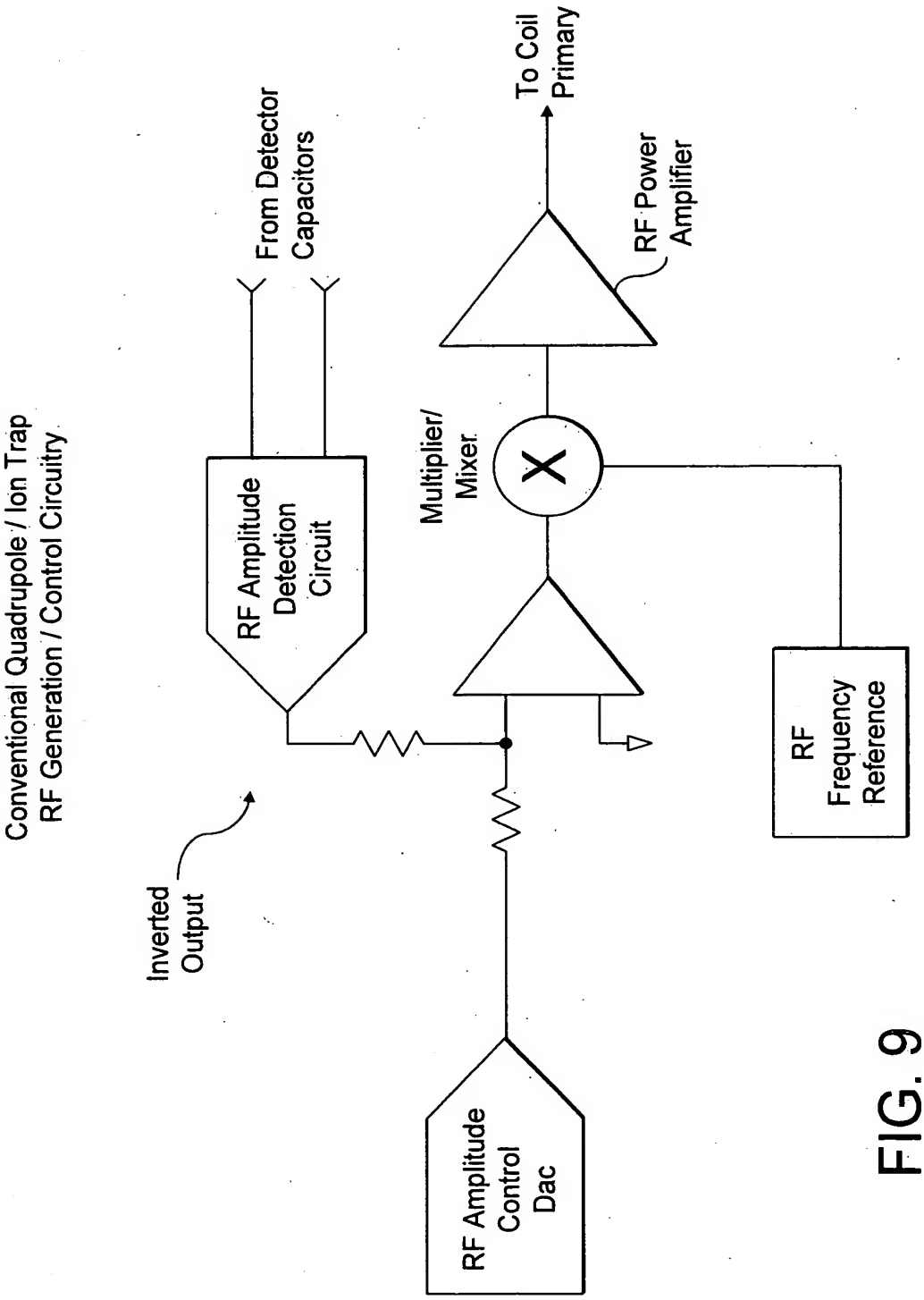
Conventional Quadrupole / Ion Trap
RF Generation / Control Circuitry
From Detector
Capacitors
To Coil
Primary
RF Power
Amplifier
RF Amplitude
Detection
Circuit
Multiplier/
Mixer
Inverted
Output
RF
Frequency
Reference
RF Amplitude
Control
Dac

FIG. 9

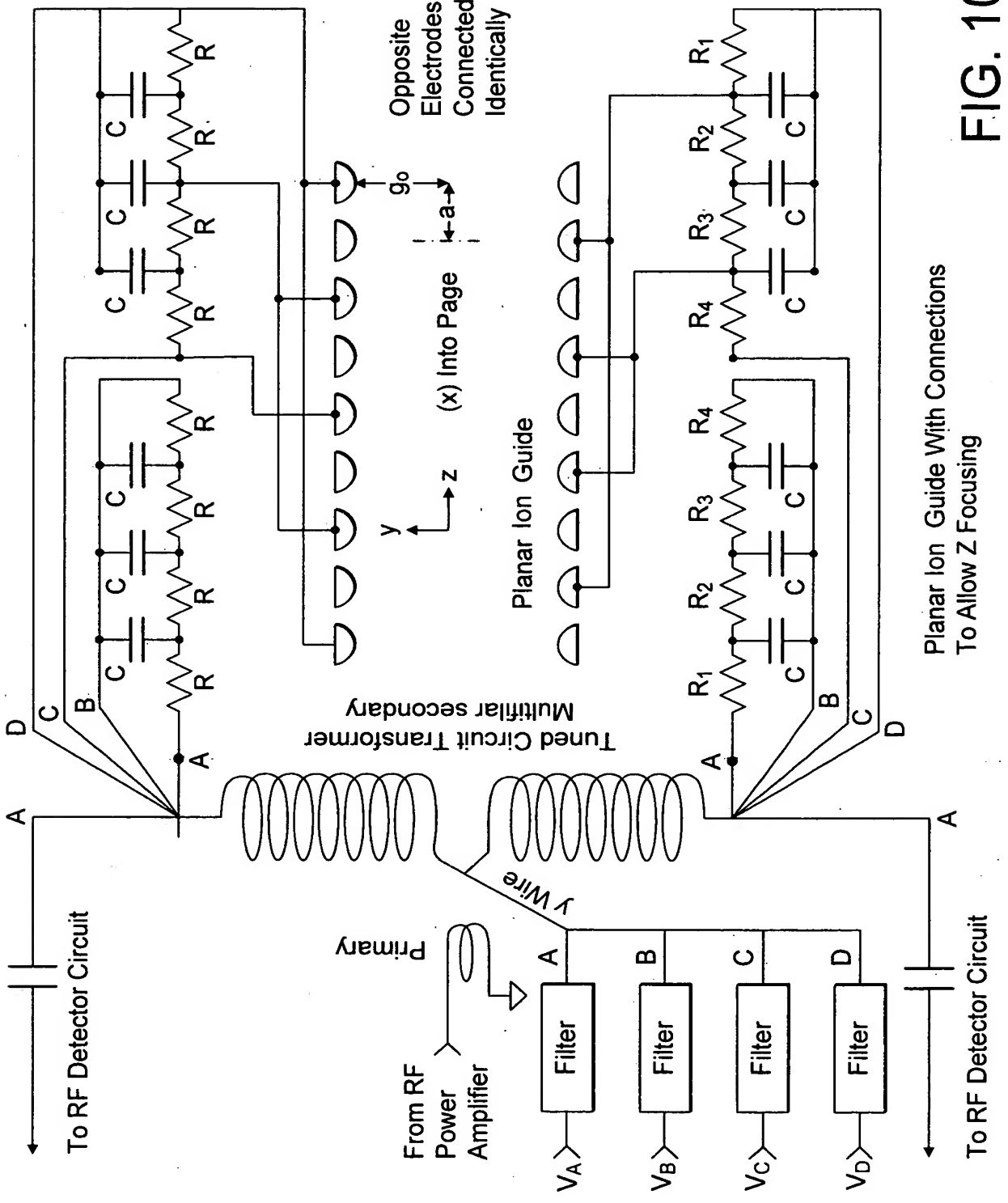
Opposite Electrodes Connected Identically
g_o
a
(x) Into Page
z
y
Planar Ion Guide
Tuned Circuit Transformer Multifilar secondary
Planar Ion Guide With Connections To Allow Z Focusing
To RF Detector Circuit
To RF Detector Circuit
From RF Power Amplifier
Primary
y Wire
Filter
Filter
Filter
Filter
V_A
V_B
V_C
V_D
A
B
C
D
R
C
R_1
R_2
R_3
R_4

FIG. 10

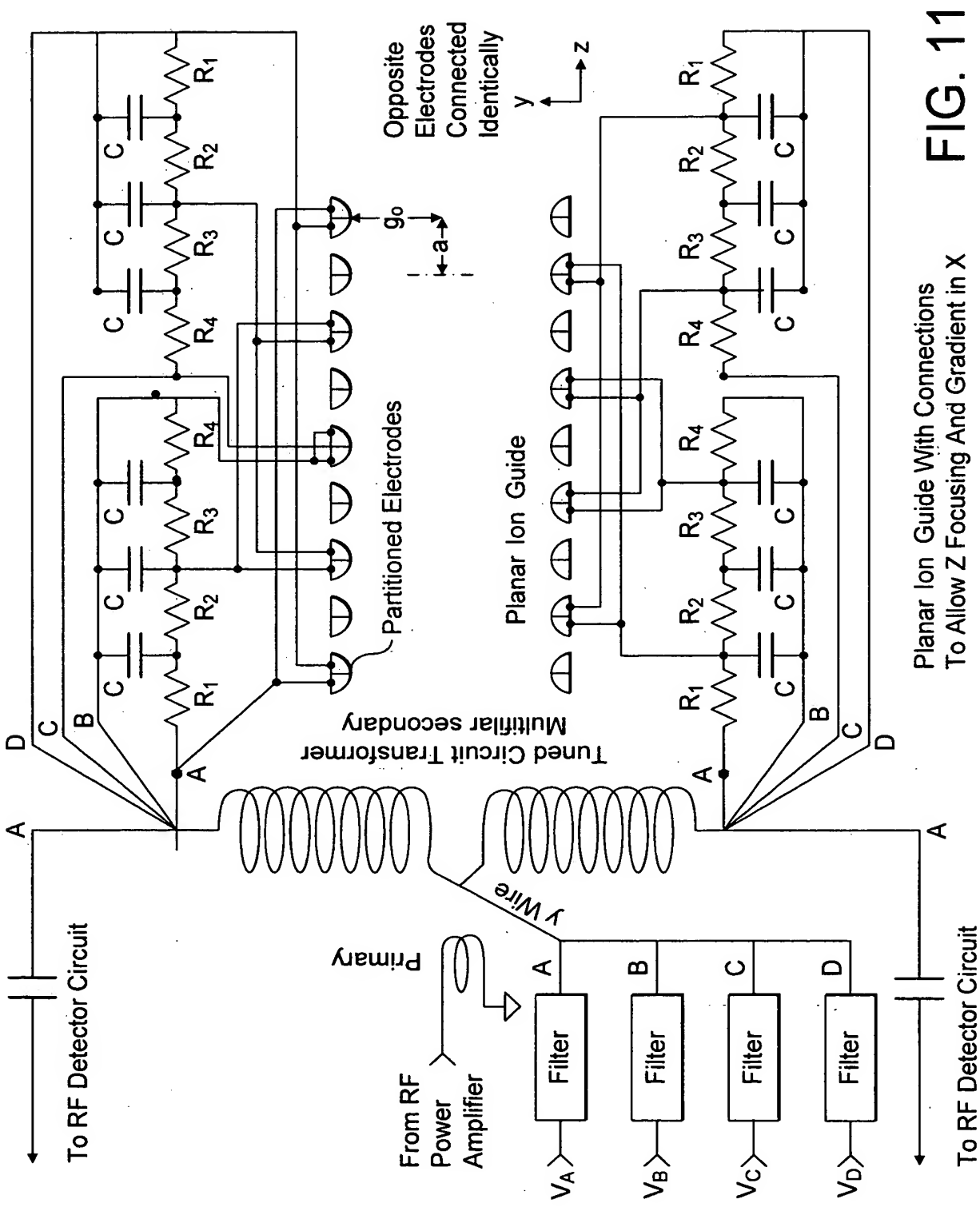
To RF Detector Circuit
A
D
C
B
A
Tuned Circuit Transformer
Multifilar secondary
Partitioned Electrodes
Opposite
Electrodes
Connected
Identically
g_o
a
y
z
Planar Ion Guide
Planar Ion Guide With Connections
To Allow Z Focusing And Gradient in X
To RF Detector Circuit
A
y Wire
Primary
From RF
Power
Amplifier
Filter
Filter
Filter
Filter
A
B
C
D
V_A
V_B
V_C
V_D
R_1
R_2
R_3
R_4
C

FIG. 11

Circuitry To Create Need DC Voltages
For Planar Ion Guide

Estimated Voltages

$V_Z \approx 4$ Volts

$V_X \sim 0.5$ Volts or Less

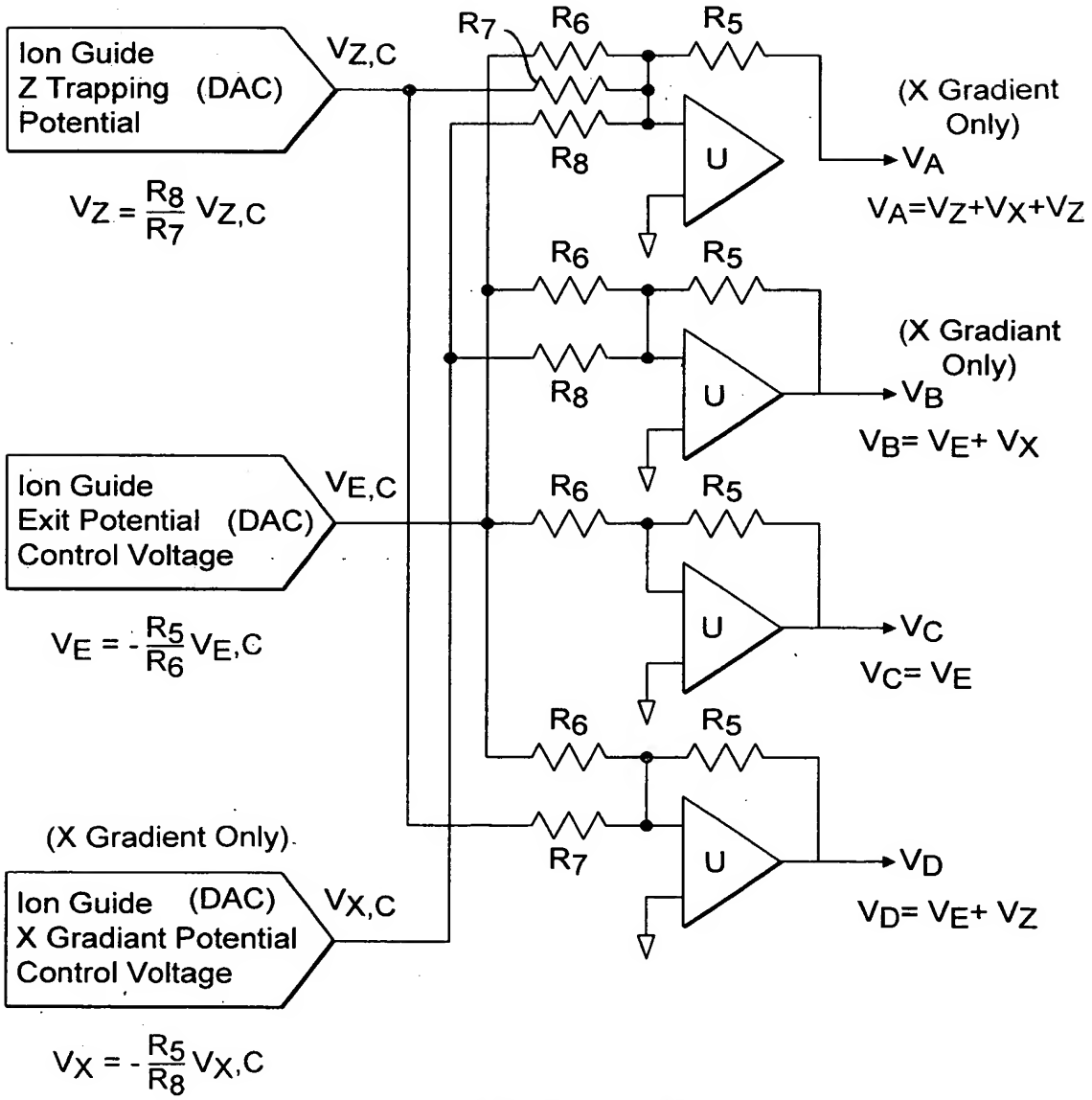

FIG. 12

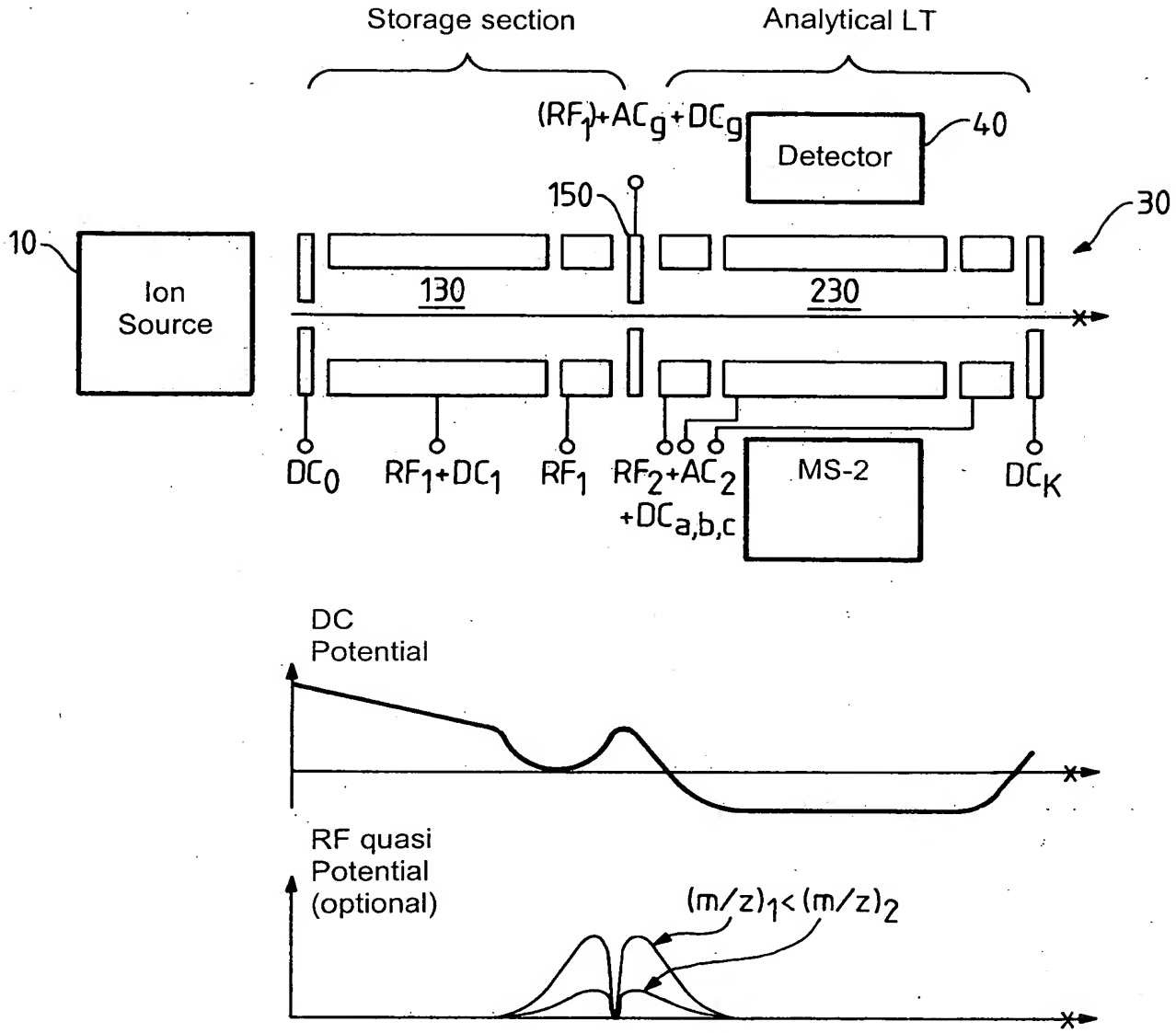
Storage section
Analytical LT
(RF1)+ACg+DCg
Detector
40
150
30
10
Ion Source
130
230
DC0
RF1+DC1
RF1
RF2+AC2 +DCa,b,c
MS-2
DCK
DC Potential
RF quasi Potential (optional)
(m/z)1<(m/z)2

FIG. 13